

--9. A particulate matter combustion catalyst according to claim 3, wherein said NO oxidation catalyst and NO₂ decomposition catalyst are carried on a particulate matter filter.--

B
--10. A particulate matter combustion catalyst according to claim 4, wherein said NO oxidation catalyst and NO₂ decomposition catalyst are carried on a particulate matter filter.--

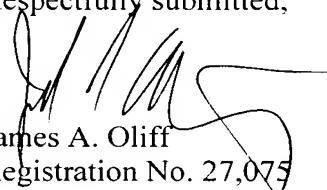
REMARKS

Claims 1 - 10 are pending. By this Preliminary Amendment, the specification is amended and claims 7-10 are added. The amendments are supported by the specification at page 6, lines 22-27, and Fig. 1. No new matter is added.

Early and favorable consideration of the application is respectfully requested.

The attached Appendix includes marked-up copies of the specification (37 C.F.R. 1.121(c)(1)(ii)).

Respectfully submitted,


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Attached: Appendix
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APPENDIX

Changes to Specification:

Page 4, lines 16-18:

Fig. 1(a) is a schematic illustration of a wall cross-section of a ~~monolith~~-filter carrying the catalysts of the invention.

Page 4, lines 19-21:

Fig. 1(b) is a schematic illustration of a cross-section of a ~~monolith~~-filter carrying the catalysts of the invention.

Page 6, lines 26-28:

The particulate matter filter may be, for example, ~~a~~ cordierite wall-flow type ~~monolith~~-filter, and an embodiment of a filter using the catalyst of the invention is shown in Fig. 1. The wall-flow type filter is, for example, one of any two neighboring spaces is closed by a plug on the exhaust gas downstream side, and the other one is closed by a plug on the exhaust gas upstream side.

Page 6, lines 29-35:

In this embodiment, the NO oxidation catalyst and NO₂ decomposition catalyst of the invention reside as a coated layer covering the wall columns of the ~~monolith~~-filter. In the coated layer, the NO oxidation catalyst and NO₂ decomposition catalyst may reside in a randomly mixed state as shown in Fig. 2(a), or they may reside in layers as shown in Fig. 2(b).

Page 7, lines 2-10:

Tungstic acid/zirconia (WO₃/ZrO₂), silica, silica-alumina, MFI zeolite (SiO₂/Al₂O₃ = 40), dealuminized Y zeolite (SiO₂/Al₂O₃ = 200), γ -alumina, zirconia and Ba/ γ -alumina were prepared as carriers, and after coating each of the carriers onto monolith substrates, each carrier was impregnated with a dinitrodiamine Pt solution and subjected to drying and

prefiring followed by 1 hour of firing at 650°C to obtain catalysts with 2 g of Pt loaded on each carrier per liter volume of ~~monolith~~-substrate.

Page 7, table 1:

Table 1 Comparison of NO oxidation performance

Catalyst carrier	NO oxidation rate (%)	
	200°C	250°C
WO ₃ /ZrO ₂	64	93
Silica	45	92
Silica-alumina	34	92
MFI zeolite	66	92
Y zeolite	62	93
γ-alumina	15	90
Zirconia	17	90
Ba/γ-alumina	8.5	20

Catalyst component: 2 g Pt/1L ~~filter~~monolith

Page 8, lines 25-28:

The resulting slurry was coated and dried onto a ~~filter~~ monolith-substrate, and then fired at 650°C for 1 hour to form a layer containing WO₃/ZrO₂ powder and Ba/γ-alumina powder on the ~~filter~~ monolith-substrate.

Page 8, lines 29-34:

Next, the layer was impregnated with a dinitrodiamine Pt aqueous solution, and then further impregnated with a Rh nitrate aqueous solution and fired at 500°C for 1 hour to obtain a catalyst according to the invention carrying 2 g of Pt and 0.1 g of Rh per liter of ~~filter~~ monolith-substrate.

Page 9, lines 14-17:

The resulting slurry was coated and dried onto a ~~filter~~ monolith-substrate, and then fired at 650°C for 1 hour to form a layer containing WO₃/ZrO₂ powder and Fe/γ-alumina powder on the ~~filter~~ monolith-substrate.

Page 9, lines 18-23:

Next, in the same manner as Example 1, the layer was impregnated with a dinitrodiamine Pt aqueous solution, and then further impregnated with a Rh nitrate aqueous solution and fired at 500°C for 1 hour to obtain a catalyst according to the invention carrying 2 g of Pt and 0.1 g of Rh per liter of filter monolith-substrate.

Page 10, lines 2-4:

The resulting slurry was coated and dried onto a filter monolith-substrate, and then fired at 650°C for 1 hour to form a layer containing Ba/ γ -alumina powder.

Page 10, lines 5-10:

Next, the layer was impregnated with a dinitrodiamine Pt aqueous solution, and then further impregnated with a Rh nitrate aqueous solution and fired at 500°C for 1 hour to obtain a comparison catalyst carrying 2 g of Pt and 0.1 g of Rh per liter of filter monolith-substrate.

Page 10, lines 19-21:

The resulting slurry was coated and dried onto a filter monolith-substrate, and then fired at 650°C for 1 hour to form a layer containing silica powder.

Page 10, lines 22-27:

Next, the layer was impregnated with a dinitrodiamine Pt aqueous solution, and then further impregnated with a Rh nitrate aqueous solution and fired at 500°C for 1 hour to obtain a comparison catalyst carrying 2 g of Pt and 0.1 g of Rh per liter of filter monolith-substrate.

Page 10, line 34- page 11, lines 1-10:

The proportion of NO₂ decomposed to NO by the catalysts of Examples 1-2 and Comparative Examples 1-2 above was measured using diesel engine exhaust gas. Lean (air/fuel ratio = 30) and rich (air/fuel ratio = 14) operating conditions were employed, repeatedly alternated for 30 seconds and 1 second, respectively, and the NO₂ decomposition rate was measured based on the exhaust gas composition shown below, under lean conditions. The results are shown in Table 2. For the catalyst of Comparative Example 2,

there was provided a particulate matter-accumulated monolith-filter (without catalyst) downstream from the catalyst, and the NO₂ decomposition rate as measured at the outlet port of the monolith-filter.

Page 11, table 2:

Table 2 Comparison of NO₂ decomposition performance

	Catalyst		NO ₂ decomposition rate (%)	
	NO oxidation catalyst	NO ₂ decomposition catalyst	200°C	250°C
Example 1	Pt/WO ₃ /ZrO ₂	Pt/Ba/γ-alumina	85	94
Example 2	Pt/WO ₃ /ZrO ₂	Fe/γ-alumina	88	90
Comp. Ex.1		Pt/Ba/γ-alumina	78	88
Comp. Ex.2		Upstream Pt/silica + monolith filter	2.1	3.5

Catalyst components: (2 g Pt + 0.1 g Rh)/1L filtermonolith

Page 11, lines 17-27:

The results shown in Table 2 demonstrate that the catalysts of the invention exhibit very high NO₂ decomposition performance even at temperatures below 300°C. On the other hand, with Comparative Example 1 which had Pt and Ba both present on the γ-alumina carrier, the NO₂ decomposition performance was slightly lower than that of the catalysts of the invention. The catalyst of Comparative Example 2 exhibited absolutely no NO₂ decomposition performance. The reason is believed to be its structure wherein no catalyst was carried on the monolith-filter.

Page 12, table 3:

Table 3 Comparison of particulate matter (PM) combustion rates

	Catalyst		PM combustion rate (mg/sec/L)	
	NO oxidation catalyst	NO ₂ decomposition catalyst	200°C	250°C
Example 1	Pt/WO ₃ /ZrO ₂	Pt/Ba/γ-alumina	0.04	0.12
Example 2	Pt/WO ₃ /ZrO ₂	Fe/γ-alumina	0.04	0.11
Comp. Ex.1		Pt/Ba/γ-alumina	0.012	0.05
Comp. Ex.2		Upstream Pt/silica + monolith filter	0.002	0.006

Catalyst components: (2 g Pt + 0.1 g Rh)/1L filtermonolith